Value of Swine Manure

Swine manure is a valuable by-product of the swine operation that can be utilized as a fertilizer resource. By conserving the nutrient value of the manure generated by the swine operation, less money can be spent on commercial fertilizer and there is a potential to market manure to local crop producers.

What Affects Manure Composition?

Composition of the pig’s feed, utilization of feed nutrients, amount of water and feed spillage and the length and method of manure storage all affect manure composition. If excess nutrients are fed to pigs above the nutrient needs of the pig or if the nutrients are not digested and retained in their bodies, excess nutrients will be excreted and increase manure nutrient composition. Similarly, if excess feed is spilled in manure pits, excess nutrients will be present in the manure. Conversely, excess spillage of water in manure pits will reduce the concentration of manure nutrients. Finally, if manure is stored long-term in a treatment facility such as a lagoon, considerable nitrogen losses occur which reduces its fertilizer value and recovery of the nutrients from settled sludge in the bottom of the lagoon may be difficult. Consider settling nutrients in a storage structure prior to the lagoon treatment system for concentration of nutrients for fertilizer use.

Managing Manure Nutrients

- **Minimize feed spillage** – even though spilled feed will increase manure nutrient content, this is a very costly and inefficient way of fertilizing crops versus using commercial fertilizer.

- **Minimize water spillage** – check water systems daily for leakage problems and repair as needed immediately. Excess water spillage not only dilutes the manure nutrient content, but also reduces the length of manure storage capacity.

- **Cover manure storages** – slurry in buildings or covered outside the building storage that is not exposed to rainfall will have maximal concentration of manure nutrients.

- **Treating manure nutrients** – concentrate a portion of manure nutrients as a solid through solid-liquid separation techniques and composting. This will allow for reduced transportation costs of manure nutrients for greater distances. Although not used extensively in commercial operations, the separation of urine from feces will minimize the losses of nitrogen from manures. Acidification of manure will reduce the pH of manure and reduce nitrogen losses but this may be expensive to use. Diet manipulation can also reduce the pH of manure, minimizing nitrogen losses during storage.

- **Mix manure before removal from pits** – agitate manure at the time of removal from storage for a uniform mixture of nutrients for application to cropland. For lagoon systems, routine removal of solids from the primary cell may be necessary to avoid buildup of solids and reduced storage capacity.

- **Obtain a representative manure sample** – a representative manure sample needs to be obtained and analyzed to establish application rates onto cropland.

- **Determine manure application rates** – this is based on the manure composition analysis and nutrient needs for the crop to be grown on the application site.

- **Calibrate application equipment** – use routine calibration methods on your application equipment to establish accurate manure application rates.

- **Incorporate manure** – use direct injection or other
incorporation land application techniques to mini-
mize volatile (especially nitrogen) losses. If surface 
applying, try to incorporate as soon as possible. Odors 
will be eliminated or suppressed with incor-
poration of manure.

• **Select the application sites** – place a high priority on ap-
plying manure to fields where the soil test is low (especially 
for phosphorus) and with crops removing the most total 
nutrients from the manure (generally corn and other 
cereal grains).

• **Select the time of application** – applying manure 
nutrients near the time that the plants can use 
materials to meet the crop needs is most beneficial. Applying manure in summer or fall may result in 
considerable nitrogen losses. However, cost and 
amount of manure storage may dictate when ma-
nure must be applied. Use a nitrification inhibitor to 
retain manure nitrogen if applied in the fall or wait 
to apply manure in the late fall when soil tempera-
tures are low (below 50°F).

What about the Feed Rations?

Availability of feed ingredients, costs and performance 
of pigs on the rations will dictate how the rations will be 
formulated. If significant diet formulation changes are 
made, it will change the output of nutrients and poten-
tially volume of manure produced. Analysis of manure 
and adjustments for application rates will need to be 
made. Do not feed excess nutrients (especially nitrogen) 
for the purpose of creating manure with concentrated 
nutrients because there can be considerable losses dur-
ing storage and lack of recovery of nutrients. In addition, 
excess nutrients can accumulate in the soil (especially 
phosphorus and potassium) from concentrated manure 
applications and the need for greater acreages and cost 
for manure application may result.

What is the Goal?

Develop a whole farm nutrient 
balance on your farm so that you 
can utilize the generated ma-
nure nutrients efficiently for the 
cropping program to maximize 
its fertilizer value. Is the cropping 
program utilizing all of the nitrogen, phosphorus and po-
tassium of the manure nutrients generated on the farm?

If phosphorus is accumulating in the soil is it because of 
selection of application sites, cropping program or lack 
of sufficient land for manure application? Can phospho-
rus be reduced in the pig’s diet to reduce phosphorus 
excretion and manure P concentration? Comparing the 
amount of nutrient imports (imports) on the farm to the 
amount of nutrient exports through sale of animals and 
crops can determine a whole farm nutrient balance. Con-
sult with a technical service provider, crop consultant or 
nutritionist for assistance.

For more information, please search for the following 
resources in PIG:

**PIG Factsheets:**
- Marketing Swine Manure as a Fertilizer
- Energy and Nutrient Recovery from Swine Manures
- Solids Separation in Manure Handling Systems
- Phosphorus Management in Pork Production
- Comprehensive Nutrient Management Planning for 
  Your Pork Production Operation
- Managing Nutrient Excretion and Odor in Pork Pro-
  duction through Nutrition

**PIG References:**
- Phosphorus Management in Pork Production
- Energy and Nutrient Recovery from Swine Manures

**References:**
- Massey, R. Marketing Swine Manure as a Fertilizer. 
  Factsheet 10-02-06. Pork Information Gateway; 
  2007.
- Powers, W. & Burns, R. Energy and Nutrient Recovery 
  from Swine Manures. Factsheet 10-02-01. Pork Infor-
  mation Gateway; 2006.